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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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ANTHONY J. BOURGET			EXAMINER	
P.O. BOX 81			EWALD, MARIA VERONICA	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/815,475	Applicant(s) GREGERSON ET AL.	
	Examiner MARIA VERONICA D. EWALD	Art Unit 1791	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 December 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 and 30-61 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-21 and 30-61 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01 April 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

13. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on December 10, 2008 has been entered.

Claim Rejections - 35 USC § 103

14. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1 – 4, 10 – 12, 15 – 16, 51 and 53 – 54 are rejected under 35 U.S.C.

103(a) as being unpatentable over Keim (U.S. 4,430,914) in view of Mutti, et al. (U.S. 4,778,372) and further in view of Atake (U.S. 6,325,607). Keim teaches an apparatus for automatically embossing carrier pockets in a continuous strip of plastic material to form a carrier tape, the apparatus comprising: a stationary guide structure for positioning and guiding the strip in the apparatus (items 40, 42, 44 and 46 – figure 7a; column 3, lines 25 – 30); a drive assembly adapted to selectively engage and feed the strip through the

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guide structure in a sequence of uniform increments (item 60 – figure 2); a heating assembly adapted to heat at least one region on each increment of the strip (item 12 - figure 1); and a molding assembly for molding the heated region into a pocket, the molding assembly including a pair of mold portions selectively contactable with the at least one pocket region, the pair of mold portions including a male mold portion and a corresponding female mold portion (item 14 – figure 1; column 4, lines 40 – 45); wherein the drive assembly includes a drive roller and an opposing friction roller positioned so as to frictionally engage the strip therebetween (item 62 and 63 – figure 6a); wherein the friction roller is selectively positionable in at least a first position wherein the friction roller is engaged with the strip and a second position wherein the friction roller is spaced apart from the strip (column 4, lines 1 – 15) and wherein the drive roller is driven by a servo-motor (column 3, lines 55 – 57); wherein there is an indexing assembly for accurately positioning the strip in the guide structure (item 18 – figure 3; column 3, lines 20 – 25); wherein the strip of plastic material is wound on a reel and further comprising a feed control mechanism to selectively feed the strip to the drive mechanism from the reel (item 30 – figure 1; column 4, lines 33 – 40). Furthermore, the control system is connected to the drive assembly, the heating assembly and the molding assembly, respectively (column 4, lines 33 – 65). It is noted that Keim also teaches that there is a trimming assembly wherein the formed cavities or pockets are trimmed from the sheet (column 4, lines 39 – 60); wherein the stationary guide structure comprises at least a first plate and a second plate (figure 7a); wherein the first plate has a channel for receiving the continuous strip between the first plate and the second plate (figures 7a

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and 7b); and wherein said first plate and said second plate have at least one slot extending through the thickness of the plate (figures 7a and 7b; column 3, lines 30 – 35).

Keim, however, fails to teach that the heating assembly is positionable in a retracted position, wherein there is further a heat shield assembly arranged to selectively interpose a heat shield between the portion and the strip, or wherein there is a punching assembly or that the control mechanism is further connected to the heat shield assembly.

With respect to the retractable and positionable heating assembly, Mutti, et al. teach the use of upper and lower heating plates which may be retractable vertically relative to contacting the sheet (item 1 – figure 1). This adjustment allows a contact pressure with the sheet and occurs via a hydraulic or pneumatic mechanism (column 5, lines 45 – 50). This suggests, retractable portions of the heating assembly, which are adapted to apply heat to the strip in one region. Furthermore, Mutti, et al. teach a punching assembly to punch out the pocket or depression formed. The punch assembly is comprised of a shaft with a head portion defined at a distal end thereof, wherein the cross-sectional dimensions of the shaft are less than that of the head assembly (item 5' – figure 6; column 8, lines 5 – 30).

With respect to the use of a heat shield, Atake teaches a heat shield assembly in a thermoforming apparatus, which is arranged to selectively interpose a heat shield between the heating assembly and the strip (item 85 – figure 8; column 10, lines 55 – 65). The heat shield is inserted between the preheater and the sheet if the sheet is

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suddenly stopped and thus, the heat shield prevents any undue warpage of the sheet which may be "stuck" in the preheater (column 10, lines 50 – 60). Atake also teaches control system operatively connected to control the drive, heating, heat shield, and molding assemblies, respectively (column 3, lines 15 – 20; column 4, lines 3 – 5; column 9, lines 45 – 65).

Thus, because Keim, Mutti, et al. and Atake all teach thermoforming apparatus, it would have been obvious to one of ordinary skill in the art at the time of the Applicant's invention to configure the apparatus of Keim with the retractable heating assembly of Mutti, et al., further configured with the heat shield of Atake for the purposes of heating only the portions of the sheet which are to be deformed, while also punching out the individual pockets formed as taught by Mutti, et al. and for ensuring that, if sheet movement is ceased, any portion "stuck" in the preheater is not heated to the point of warpage as taught by Atake.

Claims 5 – 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Keim, in view of Mutti, et al., in view of Atake and further in view of Ekendahl, et al. (U.S. 6,659,758). Keim, Mutti, et al. and Atake teach the characteristics previously described but do not teach that the strip of plastic material has at least one series of uniformly spaced sprocket holes, wherein the molding assembly has a plurality of pilot pins adapted to be selectively engageable with the sprocket holes.

In a method to clamp and index a sheet through a thermoforming apparatus, Ekendahl teaches that clamping means can be comprised of a belt conveyor system

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gripped on both sides by pins attached to a chain (column 5, lines 1 – 5). Similarly, a reciprocating shuttle that grips the sheets along the edges can be used (column 5, lines 5 – 8). Ekendahl also teaches that other means can be used, such as mechanical frames which attach to holes in the sheet (column 5, lines 15 – 20). Thus, such means as claimed by Applicant are like those described by Ekendahl, which are means to grip and convey the sheet through the apparatus.

Thus, it would have been obvious to one of ordinary skill in the art at the time of the Applicant's invention to configure the apparatus of Keim with the structural elements of Mutti, et al. and Atake further configured with the gripping structure of Ekendahl, comprised of a mechanical frame assembly corresponding to holes in the sheet for the purpose of gripping and transferring the sheet through the molding apparatus.

Claims 7 – 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Keim, in view of Mutti, et al., in view of Atake and further in view of Desnick (U.S. 3,642,411). Keim, Mutti, et al. and Atake teach the characteristics previously described but do not teach that the heat shield assembly includes a body portion and a pair of spaced apart shield plate portions projecting therefrom, the shield plate portions adapted to be selectively positionable so that each shield member is disposed between the strip and a separate contact portion of the heating assembly, wherein the heat shield includes a pair of air diffusers in the body portion, each diffuser positioned so as to direct air onto a surface of a separate one of the shield plate portions.

In a thermoforming apparatus, Desnick teaches the use of heat shield members (items 115 and 116 – figure 8), which cover upper and lower portions of the sheet which are not be contacted or molded. The heat shield members further include passages to cool the heat shield members (column 6, lines 40 – 50), such that cooling fluid is circulated through the passages.

Thus, because the secondary reference of Atake already teach the use of a heat shield, it would have been obvious to one of ordinary skill in the art at the time of the Applicant's invention to modify the apparatus of Keim, with the elements of both Mutti, et al. and Atake, further modified with the upper and lower heat shield plates of Desnick for the purpose of preventing any temperature increase in the sheet which may cause sheet warpage, should the apparatus operation be discontinued.

Claim 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Keim in view of Mutti, et al., in view of Atake and further in view of Dupraz (U.S. 5,437,546). Keim, Mutti, et al. and Atake teach the characteristics previously described but do not teach the presence of an air curtain as a heat shield. The use of an air curtain is merely to cool the sheet and deter any increased temperature rise, which may cause warpage of the sheet. Thus, it would have been obvious to implement an air curtain as the shield.

For example, in an apparatus to cool an extruded film or foil, Dupraz teaches the use of an air curtain which is discharged from a slit of a tubular body (column 4, lines 50 – 60). The use of the air curtain and the control of the air flow deters any curling of the sheet (column 5, lines 50 – 54). Thus, the quality of the sheet is maintained.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the Applicant's invention to configure the apparatus of Keim with the elements of Mutti, et al. and Atake with the air curtain of Dupraz for the purpose of preventing any warpage of the sheet and maintaining its quality.

Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Keim in view of Mutti, et al., in view of Atake, in view of Ekendahl and further in view of Wheaton, III, et al. (U.S. 3,706,517). Keim, Mutti, et al. and Atake teach the characteristics previously described but do not teach that the plastic sheet has at least one series of uniformly spaced sprocket holes and wherein the indexing assembly includes a ball detent mechanism. As noted previously, the primary reference of Keim already teaches an indexing means for moving the sheet and the use of a ball detent mechanism corresponding to sprocket holes in the sheet are merely another type of indexing means and is obvious to one of ordinary skill.

For example, in a method to clamp and index a sheet through a thermoforming apparatus, Ekendahl teaches that clamping means can be comprised of a belt conveyor system gripped on both sides by pins attached to a chain (column 5, lines 1 – 5). Similarly, a reciprocating shuttle that grips the sheets along the edges can be used (column 5, lines 5 – 8). Ekendahl also teaches that other means can be used, such as mechanical frames which attach to holes in the sheet (column 5, lines 15 – 20). Thus, such means as claimed by Applicant are like those described by Ekendahl, which are means to grip and convey the sheet through the apparatus.

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In addition, in a rotating turret used to transfer work pieces between stations, Wheaton, III, et al. teach the use of a rotating crank arm (item 78 – figure 2), to which a flag (item 76 – figure 2) is attached. The flag is rotated and firmly seated on the crank arm via a ball detent and spring mechanism (item 140 – figure 8). The ball detent and spring mechanism ensures the flag member is held securely during rotation and indexing. Furthermore, the crank arm and flag are indexed from one position to another to engage the turret head, thereby indexing it from one station to another. In the apparatus of Wheaton, III, et al., the turret is indexed in an injection blow molding machine with three or more work stations, wherein the preforms are first formed and subsequently processed (column 2, lines 15 – 20).

Thus, Keim, Mutti, et al. and Atake teach thermoforming apparatus, wherein a plastic sheet is conveyed through a series of stations. Keim also teaches that there are indexing means for the sheet. Ekendahl teaches the use of many types of conveying or indexing means for the plastic sheet, of which one type of means is the use of holes in the sheet which engage mechanical frames. In a rotating turret, Wheaton, III, et al. teach indexing means wherein a flag is secured to a rotating crank arm, causing the turret to index from one station to another, wherein the flag is secured to the crank arm via a ball detent mechanism.

Therefore, because each of the above references teaches some type of indexing means for conveying a work piece, it would have been obvious to one of ordinary skill in the art at the time of the Applicant's invention to configure the apparatus of Keim with the elements of Mutti, et al., Atake and Ekendahl, further configured with the ball detent

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mechanism of Wheaton, III, et al. for the purpose of conveying and indexing the sheet through the work stations.

Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Keim, in view of Mutti, et al., in view of Atake, in view of Ekendahl and further in view of Oster, et al. (U.S. 6,380,549). Keim, Mutti, et al. and Atake teach the characteristics previously described but do not teach that the plastic sheet has at least one series of uniformly spaced sprocket holes and wherein the indexing assembly includes a light sensor to register the sprocket holes. As noted previously, Keim already teaches an indexing means for moving the sheet and the use of a light sensor corresponding to sprocket holes in the sheet are merely another type of indexing means and is obvious to one of ordinary skill in the art.

For example, in a method to clamp and index a sheet through a thermoforming apparatus, Ekendahl teaches that clamping means can be comprised of a belt conveyor system gripped on both sides by pins attached to a chain (column 5, lines 1 – 5). Similarly, a reciprocating shuttle that grips the sheets along the edges can be used (column 5, lines 5 – 8). Ekendahl also teaches that other means can be used, such as mechanical frames which attach to holes in the sheet (column 5, lines 15 – 20). Thus, such means as claimed by Applicant are like those described by Ekendahl, which are means to grip and convey the sheet through the apparatus.

With respect to the use of light sensor, Oster, et al. teach the use of a light sensor to detect pin-holes in foils, such that the light sensor is aligned with the holes.

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Thus, Keim, Mutti, et al. and Atake teach thermoforming apparatus, wherein a plastic sheet is conveyed through a series of stations. Keim also teach that there are indexing means for the sheet. Ekendahl teaches the use of many types of conveying or indexing means for the plastic sheet, of which one type of means is the use of holes in the sheet which engage mechanical frames. Oster, et al. teach the use of a light sensor which registers or detects pin holes in foils.

Therefore, because each of the above references teaches some type of indexing means for conveying a work piece, it would have been obvious to one of ordinary skill in the art at the time of the Applicant's invention to configure the apparatus of Keim with the elements of Mutti, et al., Atake and Ekendahl, further configured with the light sensor of Oster, et al. for the purpose of conveying and indexing the sheet through the work stations.

Claims 17 – 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Keim, in view of Mutti, et al., in view of Atake and further in view of Straumanis (U.S. 3,904,338). Keim, Mutti, et al. and Atake teach the characteristics previously described but do not teach the specific control system as claimed, wherein there is an automatic operating mode and a pause mode.

In a method to control thermoforming of an extruded sheet, Straumanis teaches the use of a control system and sensors which monitor the thermoforming operation and control the conveyance of the sheet to the thermoformer, such that in an intermittent mode, an accumulator is used to take up the slack, such that the extruded sheet is not

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warping or becoming damaged if it sags, while waiting to be conveyed to the thermoformer (column 2, lines 50 – 65). The thermoforming apparatus of Straumanis includes an intermittent-activated process, wherein the sheet is indexed through the preheater and subsequently to the mold (column 5, lines 40 – 50). The control system of Straumanis incorporates the use of sensors and a dancer roll (item 23 – figure 23), which synchronizes the indexing of the sheet to the thermoformer from the extruder, such that the sheet is adequately fed to the thermoformer without sacrificing throughput and damage to the sheet, should operation stop or slow down (column 6, lines 6 – 50). Thus, the control system of Straumanis suggests a control system functioning like that of Applicant, wherein the control system defines a normal automatic mode and a selectable pause mode, wherein the strip is held stationary, the portion is positioned in the retracted position and the heat shield is positioned between the portions and the strip, wherein there is a synchronizing assembly arranged to receive embossed carrier tape from the apparatus, the synchronizing assembly including a pair of sensors, a first sensor of said pair being arranged to generate a signal when the amount of carrier tape present in the synchronizing assembly is in excess of a first predetermined amount and a second sensor of said pair being arranged to generate a signal when the amount of carrier tape present in the synchronizing assembly is less than a second predetermined amount, wherein each of the pair of sensors is operably connected with the control system, and wherein the control system is adapted to automatically initiate the pause mode when the amount of carrier tape present in the synchronizing assembly is in excess of the first predetermined amount and to automatically initiate the normal

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automatic operating mode when the amount of carrier tape present in the synchronizing assembly is less than a second predetermined amount.

Thus, it would have been obvious to one of ordinary skill in the art at the time of the Applicant's invention to configure the apparatus of Keim with the elements of Mutti, et al. and Atake further configured with the control system of Straumanis for the purpose of effectively conveying the strip or sheet through the preheater and molding stations, such that any pause in the operation, is registered by the apparatus and varies the speed or slack of the sheet, such that any portion of the sheet not yet molded, is not warped or damaged at any point in the operation.

Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Keim, in view of Mutti, et al., in view of Atake and further in view of Fritz, et al. (U.S. 6,257,866). Keim, Mutti, et al. and Atake teach the characteristics previously described but do not specifically teach that the female mold portion has an opening defined therein, the opening selectively operably connected with a supply of compressed gas, and wherein a stream of compressed gas is selectively directed from the opening against the strip to urge the strip against the male mold. However, the use of compressed gas is known to one of ordinary skill in the art of thermoforming, whether used to expel gas onto the sheet surface to urge it against the mold or used as a vacuum to hold the sheet against a mold surface.

For example, in a thermoforming apparatus, Fritz, et al. teach the use of a upper and lower platens (items 16 and 18 – figure 1), in which both platens have vacuum and

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air pressure sources connected to them urging the sheet against the mold form (item 14 – figure 1). Initially, the plastic sheet is heated to its pliant state, allowing it to be molded. To ensure it does not sag, a vacuum source is operated to maintain the sheet against the heating plate (item 50 – figure 1). Subsequently, the air pressure source is activated to urge the sheet against the bottom platen and thereby against the mold (column 4, lines 25 – 40, 45 – 55). Thus, the use of the air flow ensures that the sheet is pressed firmly against the mold form and adequately shaped.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the Applicant's invention to modify the apparatus of Keim with the elements of Mutti, et al. and Atake further configured with the air pressure source of Fritz, et al. for the purpose of ensuring that the sheet is firmly pressed against the mold form and thus, adequately shaped.

Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Keim in view of Mutti, et al., in view of Atake and further in view of Arends, et al. (U.S. 5,939,107). Keim, Mutti, et al. and Atake teach the characteristics previously described but do not teach that the guide structure is oriented vertically so that the strip passes through the heating assembly in a generally vertically path. This however, is merely, changing the position of the structural elements but does not change the function of the elements. See *In re Japikse*, 181 F.2d 1019, 86 USPQ 70 (CCPA 1950) (Claims to a hydraulic power press which read on the prior art except with regard to the position of the starting switch were held unpatentable because shifting the position of the starting

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switch would not have modified the operation of the device); In re Kuhle, 526 F.2d 553, 188 USPQ 7 (CCPA 1975). Furthermore, it is known to one of ordinary skill in the art that a vertical preheater can be used to heat a sheet prior to thermforming.

For example, in a thermoforming apparatus, Arends teaches that the conveyance of the sheet from the reel through the drive rollers and subsequently to the heater occurs in generally a vertical path prior to the thermoforming apparatus. The preheater itself is oriented vertically, while drive rollers and guide rollers are also oriented vertically with respect to each other, thereby pulling the sheet in the vertical direction.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the Applicant's invention to modify the apparatus of Keim, with the elements of Mutti, et al. and Atake further configured with the vertical orientation of drive rollers and the preheater of Arends, et al. for the purpose of engaging the sheet, thereby moving it through the apparatus and disengaging from the sheet, to allow threading of the sheet onto the reel or any corrections to the apparatus operation.

Claims 30 and 59 – 61 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bippus (U.S. 3,577,700) in view of Atake. Bippus teaches a thermoforming apparatus including a pair of opposing heat contact surfaces (item B – figure 1), but fails to teach a heat shield assembly adapted to selectively interpose a heat shield between each contact surface and the strip, when the process is paused thereby preventing heat damage to the strip resulting from excessive heat transfer between the contact surfaces and the strip.

With respect to the use of a heat shield, Atake teaches a heat shield assembly in a thermoforming apparatus, which is arranged to selectively interpose a heat shield between the heating assembly and the strip (item 85 – figure 8; column 10, lines 55 – 65). The heat shield is inserted between the preheater and the sheet if the sheet is suddenly stopped and thus, the heat shield prevents any undue warpage of the sheet which may be "stuck" in the preheater (column 10, lines 50 – 60).

Thus, it would have been obvious to one of ordinary skill in the art at the time of the Applicant's invention to configure the apparatus of Bippus with the retractable heat shield assembly of Atake such that a heat shield is interposed as claimed between each contact surface of Bippus and the strip for the purpose of preventing overheating of the sheet, which may cause warpage or deformation as taught by Atake.

The Examiner is noting that the phrase "an apparatus....to form the pocket," which precedes the transitional language "the apparatus including," is part of the preamble, and is a recitation of intended use. The structural elements which are essential to the claim itself are the element(s) *proceeding* the transitional language, which includes the heat shield and the pair of opposing heat contact surfaces.

Claims 31 – 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bippus in view of Atake and further in view of Desnick. Bippus and Atake teach the characteristics previously described but do not teach that the heat shield assembly includes a body portion and a pair of spaced apart shield plate portions projecting therefrom, the shield plate portions adapted to be selectively positionable so that each

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shield member is disposed between the strip and a separate contact portion of the heating assembly, wherein the heat shield includes a pair of air diffusers in the body portion, each diffuser positioned so as to direct air onto a surface of a separate one of the shield plate portions.

In a thermoforming apparatus, Desnick teaches the use of heat shield members (items 115 and 116 – figure 8), which cover upper and lower portions of the sheet which are not be contacted or molded. The heat shield members further include passages to cool the heat shield members (column 6, lines 40 – 50), such that cooling fluid is circulated through the passages.

The secondary reference of Atake already teaches the use of a heat shield. It is noted that the heat shield of Atake is movable between a retracted position and a forward position, wherein in the forward position, the shield prevents the sheet from further heating should the apparatus operation be ceased, thereby preventing any warpage of the sheet (column 10, lines 50 – 65). Desnick teaches upper and lower heat shield assemblies which can be cooled via circulating fluid through its passages. Thus, because Atake already teach the use of a heat shield, it would have been obvious to one of ordinary skill in the art at the time of the Applicant's invention to modify the apparatus of Bippus, with the heat shield of Atake, further modified with the upper and lower heat shield plates of Desnick for the purpose of preventing any temperature increase in the sheet which may cause sheet warpage, should the apparatus operation is discontinued.

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Claim 33 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bippus in view of Atake, and further in view of Dupraz. Bippus and Atake teach the characteristics previously described but do not teach the presence of an air curtain as a heat shield. The use of an air curtain is merely to cool the sheet and deter any increased temperature rise, which may cause warpage of the sheet. Thus, it would have been obvious to implement an air curtain as the shield.

For example, in an apparatus to cool an extruded film or foil, Dupraz teaches the use of an air curtain which is discharged from a slit of a tubular body (column 4, lines 50 – 60). The use of the air curtain and the control of the air flow deters any curling of the sheet (column 5, lines 50 – 54). Thus, the quality of the sheet is maintained.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the Applicant's invention to configure the apparatus of Bippus with the heat shield of Atake, further modified with the air curtain of Dupraz for the purpose of preventing any warpage of the sheet and maintaining its quality.

Claims 34 – 38, 42, 46 and 49 – 50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Keim in view of Atake. Keim teaches an apparatus for automatically embossing carrier pockets in a continuous strip of plastic material to form a carrier tape, the apparatus comprising: means for positioning and guiding the strip in the apparatus (items 40, 42, 44 and 46 – figure 7a); means for selectively engaging and feeding the strip through the guide structure in a sequence of adjacent uniform increments (item 60 – figure 2); means for heating at least one region on each increment of the strip (item 12 – figure 1); wherein said means for selectively engaging and feeding the strip through

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the guide structure includes a drive roller (item 63 – figure 2) and an opposing friction roller positioned so as to frictionally engage the strip therebetween (item 62 – figure 2); wherein the friction roller is selectively positionable in at least a first position wherein the friction roller is engaged with the strip and a second position wherein the friction roller is spaced apart from the strip (column 4, lines 1 – 30); wherein the drive roller is driven by a servo-motor (column 3, lines 55 – 57); wherein the means for molding includes a molding assembly with a male mold and a female mold arranged to be selectively engageable with opposite sides of the strip at the heated region (item 14 – figure 1; figure 2; column 4, lines 44 – 49); wherein there are indexing means for accurately positioning the strip in the guide structure (item 18 – figure 2; column 3, lines 20 – 25); wherein the strip of plastic material is wound on a reel (item 30 – figure 1) and further comprising feed control means for selectively feeding the strip to the means for selectively engaging and feeding the strip from the reel (column 4, lines 30 – 40); and wherein the apparatus includes control means operably connected to the means for selectively engaging the strip, the heating means, and the molding means (column 4, lines 30 – 40).

Keim, however, fails to teach a means for selectively shielding the strip from the heating means. This, however, is an obvious modification well within the level of one of ordinary skill in the art.

For example, Atake teaches a heat shield assembly in a thermoforming apparatus, which is arranged to selectively interpose a heat shield between the heating assembly and the strip (item 85 – figure 8; column 10, lines 55 – 65). The heat shield is

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inserted between the preheater and the sheet if the sheet is suddenly stopped and thus, the heat shield prevents any undue warpage of the sheet which may be "stuck" in the preheater (column 10, lines 50 – 60).

Thus, because Keim and Atake all teach thermoforming apparatus, it would have been obvious to one of ordinary skill in the art at the time of the Applicant's invention to configure the apparatus of Keim with the heat shield of Atake for the purpose of ensuring that, if sheet movement is ceased, any portion "stuck" in the preheater is not heated to the point of warpage as taught by Atake.

With respect to claim 34, the Examiner is noting, that Applicant has claimed a means for positioning and guiding the strip in the apparatus; means for selectively feeding the strip through the guide structure, means for heating the strip and means for selectively shielding the strip. The Examiner is interpreting such limitations as an invocation of 35 U.S.C. 112, 6th paragraph. The means for positioning and guiding the strip are noted, per Applicant's Specification as upper and lower guide plates secured via fasteners and any equivalents thereof (page 10). The means for heating the strip are noted as a pair of heating blocks (page 14) and any equivalents thereof which would heat the sheet in an equivalent manner. The means for selectively feeding the strip through the guide structure are noted as the feed roller and the equivalents thereof, which would feed the strip through the guide structure in an equivalent manner (page 11). The means for selectively shielding the strip is noted, per the Specification, page 15, as a retractable heat shield assembly and any equivalents thereof which would deter any heat to further warp the sheet, if it is stopped within the heating assembly.

With respect to claim 46, the Examiner is also noting that Applicant has claimed an indexing means for accurately positioning the strip in the guide structure. The Examiner is interpreting such limitations as an invocation of 35 U.S.C. 112, 6th paragraph. The indexing means are noted, per Applicant's Specification (page 12), as a ball detent mechanism, tape end sensor and positioning sensor (and equivalents thereof), wherein the ball detent mechanism aligns with sprocket holes when the tape is positioned in the sheet guide. The indexing means of Keim are equivalent means, which include a support roller and surface, and photosensors 17a and 17. The web or sheet is fed from the support to the web guide alignment (column 3, lines 20 – 25).

With respect to claims 35, 38, 42 – 43 and 45, the Examiner is noting that though Applicant has written the structural components in means plus function language, such is not an invocation of 35 U.S.C. 112, 6th paragraph because structure is identified within the claim which relates to the means.

Similarly, claim 50 identifies a control means operably connected with the means for feeding, heating and shielding the strip as claimed. The Examiner is not interpreting the control means as an invocation of 35 U.S.C. 112, 6th paragraph because Applicant's Specification describes a generic control system of the apparatus which controls the heating, forming and guiding means and thus, any control capable of synchronizing the actions of each component fully anticipate the control means.

Claims 39 – 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Keim in view of Atake and further in view of Ekendahl. Keim and Atake teach the

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characteristics previously described but do not teach that the strip has a series of sprocket holes.

In a method to clamp and index a sheet through a thermoforming apparatus, Ekendahl teaches that clamping means can be comprised of a belt conveyor system gripped on both sides by pins attached to a chain (column 5, lines 1 – 5). Similarly, a reciprocating shuttle that grips the sheets along the edges can be used (column 5, lines 5 – 8). Ekendahl also teaches that other means can be used, such as mechanical frames which attach to holes in the sheet (column 5, lines 15 – 20). Thus, such means as claimed by Applicant are like those described by Ekendahl, which are means to grip and convey the sheet through the apparatus.

Thus, it would have been obvious to one of ordinary skill in the art at the time of the Applicant's invention to configure the apparatus of Keim with the structural elements of Atake further configured with the gripping structure of Ekendahl, comprised of a mechanical frame assembly corresponding to holes in the sheet for the purpose of gripping and transferring the sheet through the molding apparatus.

Claim 41 is rejected under 35 U.S.C. 103(a) as being unpatentable over Keim in view of Atake and further in view of Fritz. Keim and Atake teach the characteristics previously described but do not specifically teach that the female mold portion has an opening defined therein, the opening selectively operably connected with a supply of compressed gas, and wherein a stream of compressed gas is selectively directed from the opening against the strip to urge the strip against the male mold. However, the use

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of compressed gas is known to one of ordinary skill in the art of thermoforming, whether used to expel gas onto the sheet surface to urge it against the mold or used as a vacuum to hold the sheet against a mold surface.

For example, in a thermoforming apparatus, Fritz, et al. teach the use of a upper and lower platens (items 16 and 18 – figure 1), in which both platens have vacuum and air pressure sources connected to them urging the sheet against the mold form (item 14 – figure 1). Initially, the plastic sheet is heated to its pliant state, allowing it to be molded. To ensure it does not sag, a vacuum source is operated to maintain the sheet against the heating plate (item 50 – figure 1). Subsequently, the air pressure source is activated to urge the sheet against the bottom platen and thereby against the mold (column 4, lines 25 – 40, 45 – 55). Thus, the use of the air flow ensures that the sheet is pressed firmly against the mold form and adequately shaped.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the Applicant's invention to modify the apparatus of Keim with the elements of Atake further configured with the air pressure source of Fritz, et al. for the purpose of ensuring that the sheet is firmly pressed against the mold form and thus, adequately shaped.

Claim 43 is rejected under 35 U.S.C. 103(a) as being unpatentable over Keim in view of Atake and further in view of Dupraz. Keim and Atake teach the characteristics previously described but do not teach the presence of an air curtain as a heat shield. The use of an air curtain is merely to cool the sheet and deter any increased

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temperature rise, which may cause warpage of the sheet. Thus, it would have been obvious to implement an air curtain as the shield.

For example, in an apparatus to cool an extruded film or foil, Dupraz teaches the use of an air curtain which is discharged from a slit of a tubular body (column 4, lines 50 – 60). The use of the air curtain and the control of the air flow deters any curling of the sheet (column 5, lines 50 – 54). Thus, the quality of the sheet is maintained.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the Applicant's invention to configure the apparatus of Keim with the elements of Atake with the air curtain of Dupraz for the purpose of preventing any warpage of the sheet and maintaining its quality.

The Examiner is noting that Applicant has claimed a means for selectively shielding the strip as an air curtain and thus, because structure is identified as the means, such a limitation is not interpreted as an invocation of 35 U.S.C. 112, 6th paragraph.

Claims 44 – 45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Keim in view of Atake and further in view of Mutti, et al. Keim and Atake teach the characteristics previously described but do not teach a punching means.

In a thermoforming apparatus, Mutti, et al. teach a punching assembly to punch out the pocket or depression formed. The punch assembly is comprised of a shaft with a head portion defined at a distal end thereof, wherein the cross-sectional dimensions of

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the shaft are less than that of the head assembly (item 5' – figure 6; column 8, lines 5 – 30).

Thus, because Keim, Atake and Mutti, et al. all teach thermoforming apparatus, it would have been obvious to one of ordinary skill in the art at the time of the Applicant's invention to configure the apparatus of Keim with the heat shield of Atake, further configured with the punching means of Mutti, et al. for the purposes of ensuring that, if the sheet movement is ceased, any portion “stuck” in the preheater is not heated to the point of warpage and for punching out the individual pockets formed as taught by Atake and Mutti, et al.

The Examiner is noting that Applicant has claimed in claim 44, a punching means for punching a hole in the pocket. Per Applicant's Specification, the Examiner is interpreting such a limitation as an invocation of 35 U.S.C. 112, 6th paragraph, wherein such means are upper and lower blocks and punch pins and any equivalents thereof (page 17 of Specification).

Claim 45, however, identifies structure associated with the punching means and thus claim 45 is not interpreted as an invocation of 35 U.S.C. 112, 6th paragraph.

Claim 47 is rejected under 35 U.S.C. 103(a) as being unpatentable over Keim in view of Atake, in view of Ekendahl and further in view of Wheaton, III, et al.

Keim and Atake teach the characteristics previously described but do not teach that the plastic sheet has at least one series of uniformly spaced sprocket holes and wherein the indexing assembly includes a ball detent mechanism. As noted previously,

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the primary reference of Keim already teaches an indexing means for moving the sheet and the use of a ball detent mechanism corresponding to sprocket holes in the sheet are merely another type of indexing means and is obvious to one of ordinary skill.

For example, in a method to clamp and index a sheet through a thermoforming apparatus, Ekendahl teaches that clamping means can be comprised of a belt conveyor system gripped on both sides by pins attached to a chain (column 5, lines 1 – 5).

Similarly, a reciprocating shuttle that grips the sheets along the edges can be used (column 5, lines 5 – 8). Ekendahl also teaches that other means can be used, such as mechanical frames which attach to holes in the sheet (column 5, lines 15 – 20). Thus, such means as claimed by Applicant are like those described by Ekendahl, which are means to grip and convey the sheet through the apparatus.

In addition, in a rotating turret used to transfer work pieces between stations, Wheaton, III, et al. teach the use of a rotating crank arm (item 78 – figure 2), to which a flag (item 76 – figure 2) is attached. The flag is rotated and firmly seated on the crank arm via a ball detent and spring mechanism (item 140 – figure 8). The ball detent and spring mechanism ensures the flag member is held securely during rotation and indexing. Furthermore, the crank arm and flag are indexed from one position to another to engage the turret head, thereby indexing it from one station to another. In the apparatus of Wheaton, III, et al., the turret is indexed in an injection blow molding machine with three or more work stations, wherein the preforms are first formed and subsequently processed (column 2, lines 15 – 20).

Thus, Keim and Atake teach thermoforming apparatus, wherein a plastic sheet is conveyed through a series of stations. Keim also teaches that there are indexing means for the sheet. Ekendahl teaches the use of many types of conveying or indexing means for the plastic sheet, of which one type of means is the use of holes in the sheet which engage mechanical frames. In a rotating turret, Wheaton, III, et al. teach indexing means wherein a flag is secured to a rotating crank arm, causing the turret to index from one station to another, wherein the flag is secured to the crank arm via a ball detent mechanism.

Therefore, because each of the above references teaches some type of indexing means for conveying a work piece, it would have been obvious to one of ordinary skill in the art at the time of the Applicant's invention to configure the apparatus of Keim with the elements of Atake and Ekendahl, further configured with the ball detent mechanism of Wheaton, III, et al. for the purpose of conveying and indexing the sheet through the work stations.

Claim 48 is rejected under 35 U.S.C. 103(a) as being unpatentable over Keim, in view of Atake, in view of Dupraz, in view of Ekendahl and further in view of Oster, et al. (U.S. 6,380,549). Keim, Atake and Dupraz teach the characteristics previously described but do not teach that the plastic sheet has at least one series of uniformly spaced sprocket holes and wherein the indexing assembly includes a light sensor to register the sprocket holes. As noted previously, Keim already teaches an indexing means for moving the sheet and the use of a light sensor corresponding to sprocket

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holes in the sheet are merely another type of indexing means and is obvious to one of ordinary skill in the art.

For example, in a method to clamp and index a sheet through a thermoforming apparatus, Ekendahl teaches that clamping means can be comprised of a belt conveyor system gripped on both sides by pins attached to a chain (column 5, lines 1 – 5). Similarly, a reciprocating shuttle that grips the sheets along the edges can be used (column 5, lines 5 – 8). Ekendahl also teaches that other means can be used, such as mechanical frames which attach to holes in the sheet (column 5, lines 15 – 20). Thus, such means as claimed by Applicant are like those described by Ekendahl, which are means to grip and convey the sheet through the apparatus.

With respect to the use of light sensor, Oster, et al. teach the use of a light sensor to detect pin-holes in foils, such that the light sensor is aligned with the holes.

Thus, Keim, and Atake teach thermoforming apparatus, wherein a plastic sheet is conveyed through a series of stations. Keim also teach that there are indexing means for the sheet. Ekendahl teaches the use of many types of conveying or indexing means for the plastic sheet, of which one type of means is the use of holes in the sheet which engage mechanical frames. Oster, et al. teach the use of a light sensor which registers or detects pin holes in foils.

Therefore, because each of the above references teaches some type of indexing means for conveying a work piece, it would have been obvious to one of ordinary skill in the art at the time of the Applicant's invention to configure the apparatus of Keim with the elements of Atake, Dupraz and Ekendahl, further configured with the light sensor of

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Oster, et al. for the purpose of conveying and indexing the sheet through the work stations.

Claim 52 is rejected under 35 U.S.C. 103(a) as being unpatentable over Keim in view of Mutti, et al. in view of Atake and further in view of Greiwe, et al. (U.S. 5,385,465). Keim, Mutti, et al. and Atake teach the characteristics previously described but do not teach that the first and second plates (of the guide structure) are fastened together.

In a thermoforming apparatus, Greiwe, et al. teach an indexing guide which moves the sheet into the molding station. The indexing guide is comprised of jaws or plates (items 26a and 26b – figure 9) which are mounted on rods and clamped together to grip a sheet. The rods, therefore, extend through slots in the jaws themselves.

Thus, it would have been obvious to one of ordinary skill in the art at the time of the Applicant's invention to configure the apparatus of Keim with the elements of both Mutti, et al. and Atake, further modified such that the guide structure is comprised of the fastened plates of Greiwe, et al. for the purpose of guiding the sheet through the heating and molding stations, respectively, as taught by Greiwe, et al.

Claims 55 – 58 are rejected under 35 U.S.C. 103(a) as being unpatentable over Keim in view of Mutti, et al., in view of Atake and further in view of Spieth, et al. (U.S. 4,195,840). Keim teaches an apparatus for automatically embossing carrier pockets in a continuous strip of plastic material to form a carrier tape, the apparatus comprising: a

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stationary guide structure for positioning and guiding the strip in the apparatus (items 40, 42, 44 and 46 – figure 7a; column 3, lines 25 – 30); a drive assembly adapted to selectively engage and feed the strip through the guide structure in a sequence of uniform increments (item 60 – figure 2); a heating assembly adapted to heat at least one region on each increment of the strip (item 12 – figure 1); and a molding assembly for molding the heated region into a pocket, the molding assembly including a pair of mold portions selectively contactable with the at least one pocket region, the pair of mold portions including a male mold portion and a corresponding female mold portion (item 14 – figure 1; column 4, lines 40 – 45).

Keim, however, fails to teach that the heating assembly is positionable in a retracted position, wherein there is further a heat shield assembly arranged to selectively interpose a heat shield between the portion and the strip, or wherein the guide structure includes a channel and a roller which sits within a slot of the guide structure.

With respect to the retractable and positionable heating assembly, Mutti, et al. teach the use of upper and lower heating plates which may be retractable vertically relative to contacting the sheet (item 1 – figure 1). This adjustment allows a contact pressure with the sheet and occurs via a hydraulic or pneumatic mechanism (column 5, lines 45 – 50). This suggests retractable portions of the heating assembly, which are adapted to apply heat to the strip in one region.

With respect to the use of a heat shield, Atake teaches a heat shield assembly in a thermoforming apparatus, which is arranged to selectively interpose a heat shield

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between the heating assembly and the strip (item 85 – figure 8; column 10, lines 55 – 65). The heat shield is inserted between the preheater and the sheet if the sheet is suddenly stopped and thus, the heat shield prevents any undue warpage of the sheet which may be "stuck" in the preheater (column 10, lines 50 – 60).

With respect to the elements of the guide structure, the Examiner is noting that Keim teaches a guide structure comprised of two arcuate, stationary portions which form a channel in which the sheet is conveyed. Modifying such guide means such that the structure further includes a slot into which a roller extends, or wherein the roller is a drive roller or a friction roller which cooperate together, respectively, is a modification well within the art of conveyance or guide means for a sheet.

For example, in a method to convey and move individual target sheets, Spieth, et al. teach a stationary guide means comprised of a housing with a channel, into which a sheet is fed and wherein the sheet is engaged by a roller (item 60 – figure 5) and a second roller or sprocket (item 82 – figure 5). Such a housing is identified as a target guide, which engages individual sheets, such that the sheets are conveyed to the target window.

Thus, because Keim, Mutti, et al. and Atake all teach thermoforming apparatus with indexing and/or guide means and because Spieth, et al. teach guide means for individual sheets, it would have been obvious to one of ordinary skill in the art at the time of the Applicant's invention to configure the apparatus of Keim with the retractable heating assembly of Mutti, et al., further configured with the heat shield of Atake and the guide means of Spieth, et al. for the purposes of heating only the portions of the sheet

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which are to be deformed, and for ensuring that, if sheet movement is ceased, any portion “stuck” in the preheater is not heated to the point of warpage, while engaging and guiding the sheet as taught by Mutti, et al., Atake and Spieth, et al.

Allowable Subject Matter

15. The indicated allowability of claims 34 – 50 and 55 – 58 are withdrawn in view of the newly discovered reference(s) to Keim and Spieth, et al. Rejections based on the newly cited reference(s) are detailed in the above sections.

Response to Arguments

16. Applicant's arguments with respect to claim(s) 1 and 30 have been considered but are moot in view of the new ground(s) of rejection. With respect to claim 1, the Examiner agrees that the guide structure of Atake is not stationary as claimed and as such, upon an updated search, the Examiner has cited the primary reference of Keim. Keim teach stationary arcuate members or plates which are guide means for engaging a thermoformable sheet.

With respect to claim 30, the Examiner also agrees that the reference of Atake does not teach a pair of opposing heating contact surfaces as claimed. Thus, based upon an updated search, the Examiner has cited the reference of Bippus, which teaches a heating station comprised of upper and lower heating members or opposed heating contacting surfaces as claimed.

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Furthermore, the Examiner has rejected previously-allowed claims 34 – 50 and 55 – 58. With respect to claim 34, the Examiner cites the references of Keim and Atake. Keim teach a guide means equivalent to the guide means as claimed. The positioning and guide means of Keim include arcuate members or plates disposed above and below the sheet to engage the sheet. Furthermore, Keim is cited as teaching the means for selectively engaging and feeding the strip, means for heating the portion or region on a strip and means for molding the heated region of the strip into a pocket, respectively. With respect to the heat shield or shielding means as claimed, the Examiner cites the reference of Atake. With respect to claim 55, the Examiner cites the reference(s) of Keim, in view of Mutti, et al., in view of Atake and further in view of Spieth, et al. Because the primary reference of Keim already teach a stationary guide structure, the Examiner contends that one of ordinary skill in the art of conveyance or guide means would have the knowledge to modify the guide means of Keim such that it includes a channel with a roller as taught by Spieth, et al. because Spieth, et al. teach equivalent guide means for engaging target sheets.

New claims 59 – 61 have also been rejected as obvious over the new reference of Bippus in view of Atake. Bippus teaches upper and lower heating surfaces and the Examiner contends that one of ordinary skill in the art would have the knowledge and common sense to interpose either simultaneously or selectively a heat shield between the web and each contact surface to prevent any warpage of the sheet, should the sheet cease to move through the heating station.

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Conclusion

17. Any inquiry concerning this communication or earlier communications from the examiner should be directed to MARIA VERONICA D. EWALD whose telephone number is (571)272-8519. The examiner can normally be reached on M-F, 8 - 4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dr. Yogendra Gupta can be reached on 571-272-1316. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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MVE

/Maria Veronica D Ewald/
Examiner, Art Unit 1791